**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re the Application of:

**Toni Paila et al.**

Serial No.: 09/988,241

Filed: November 19, 2001

For: MULTICAST SESSION HANDOVER

Atty. Docket No.: 004770.00026

Group Art Unit: 2682

Examiner: West, Lewis G.

Confirmation No.: 8406

**DECLARATION UNDER 37 C.F.R. § 1.131**The Honorable Assistant Commissioner for Patents  
Washington, D.C. 20231**RECEIVED**

JUN 07 2004

Technology Center 2600

Sir:

We, Toni Paila (Finnish), Jani Poikela (Finnish), Lin Xu (Chinese), Juha-Pekka Luoma (Finnish), and Rod Walsh (British), hereby declare that:

- 1) We are the joint inventors of the above-captioned application;
- 2) Prior to October 11, 2001, the filing date of U.S. Patent Application Publication US 2003/0073453 A1 (hereinafter "Basilier"), we conceived of the invention recited in claims 1-47 of the above-captioned application, at least to the extent the claims are allegedly taught by Basilier.
- 3) We prepared a disclosure document (copy attached hereto as Exhibit A) of an embodiment of the invention.
- 4) The dates deleted from Exhibit A are prior to October 11, 2001.
- 5) The disclosure document attached as Exhibit A was sent to our patent attorney, Mr. Bradley C. Wright of the law firm Banner & Witcoff, Ltd., on October 1, 2001, as evidenced by the email communication attached as Exhibit B.
- 6) On October 30, 2001, Ross Dannenberg (also an attorney with Banner & Witcoff, Ltd.) sent a draft of the above-captioned patent application to our employer for

Serial No. 09/988,241

- 2 -

Atty. Dkt. No. 004770.00026

our review. A copy of the email communicating the draft is attached as Exhibit C.

- 7) On November 13, 2001 Ross Dammenberg sent a revised draft of the above-captioned patent application. A copy of the email communicating the revised draft is attached as Exhibit D.
- 8) On November 19, 2001, the above-captioned patent application was filed in the U.S. Patent and Trademark Office.
- 9) The exchange of draft applications with our patent attorney demonstrates diligence from before October 11, 2001 until the filing of the above-captioned patent application and the constructive reduction to practice of our invention.
- 10) All acts referred to in this Declaration were performed either in the United States, or in a WTO member country, as evidenced by submitting an Invention Report to our employer's internal Patent Committee on a date prior to October 11, 2001;
- 11) The attached Exhibits have not been altered since they were originally submitted to the Patent Committee or otherwise prepared or communicated; and
- 12) We declare under penalty of perjury under the law of the United States of America that statements made herein of our own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

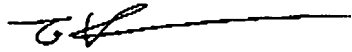
SIGNATURES BEGIN ON NEXT PAGE

Serial No. 09/988,241

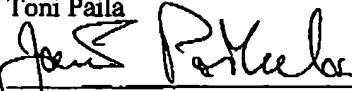
- 3 -

Atty. Dkt. No. 004770.00026

Respectfully submitted,



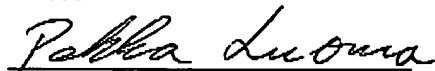
Toni Paila



Jari Poikela



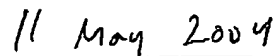
Lin Xu



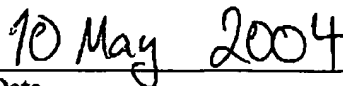
Juha-Pekka Luoma



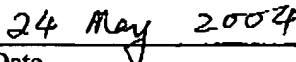
Rod Walsh



Date



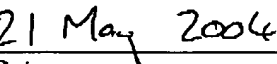
Date



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Date



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## INVENTION REPORT

Title of invention: A method for performing handover for multicast session in uni-directional access system.		<b>INVENTION REPORT RECEIVED</b>	
		Code: 19377	Patent Committee: NVO/NRC
<b>THE DESCRIPTION OF THE INVENTION MUST BE ATTACHED</b>		Place: Helsinki	Date:
		Signature:	
Inventor's name, employee number, title and nationality: *) Toni Paila, 10000517, Research Engineer, Finnish	Home Address: *) Everstinkuja 1 c 66 02600 Espoo Finland	Business Unit and cost centre: NRC 1007950	
Line Manager(s): Kari A. Rissanen			
Project : *) ASAB		Project Manager: Toni Paila	
Office address: *) NRC Ruoholahti A427			
Phone: *) +358718037389		Fax: *) +358718036856	
The invention becomes public on:			
<i>I am/ We are the sole/ and original inventor(s) of this invention.</i>  <i>The company may, by virtue of applicable legislation, be entitled to full or partial rights to the invention.</i> <i>I/ We acknowledge my/ our obligation to sign as inventor(s) all documents that may be required for protecting the invention in different countries.</i>  <b>Applicable to inventions made by inventors employed in FI, DK, DE and SE only.</b> <i>Unless the inventor requests the Invention Report to be responded to within four (4) months from the date this Invention Report is received or such other period as the mandatory provisions of the applicable local law may otherwise require, the inventor consents to the right of the employer to use a reasonable period of time for the evaluation of the invention. A reasonable period of time may exceed four (4) months.</i> <input checked="" type="checkbox"/> <i>I/ We request that the Invention Report be responded to within four (4) months.</i>  Date: Signature(s) of Inventor(s):			

\*) See the instructions

I have read and understood the invention described in this Invention Report  Date: Signature of Manager	1
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## INSTRUCTIONS FOR COMPLETING THE INVENTION REPORT

This Invention Report form is used in cases where an invention has been made by an employee of the Company. This Invention Report is confidential. Only the Patent Department may make copies of signed Invention Reports in order to request opinions or reply to the inventor(s).

The inventor completes the Invention Report and the description of the invention. The inventor does not fill in the 'Invention Report received' field. This field is filled in by the Patent Department. The Invention Report must have the names of all the inventors and their home addresses. If there is not enough space for all the names, addresses etc, please write them on a separate attachment. The first mentioned inventor is assumed to be the contact person in matters concerning the Invention Report. In the fields of office address, phone and fax, please fill in the contact person's information. Fill in the project field, if the invention is made in a project. The original Invention Report is signed by all inventors. Each page of the original Invention Report is signed by a Manager. In case it is difficult to obtain Manager's signature your Patent Department will take care of it.

It is suggested that the Invention Report and the description of the invention should be filled in as thoroughly as possible. If drawings or other kind of information cannot be attached to this form, they should be delivered separately.

The signed Invention Report is given directly to the local or business unit's Patent Department. Invention Report should also be sent by E-mail to the Patent Department. The Patent Engineer will inform the inventor of receiving the Invention Report. The Patent Engineer will obtain any expert opinions needed to properly evaluate the invention, will procure the Company's decision and inform the inventor accordingly.

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2

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## DESCRIPTION OF THE INVENTION

### 1. Field and background of the invention

The field of the invention is data networking in unidirectional access systems. More precisely the invention relates to digital broadcast systems capable of broadcasting datagrams and receivers capable of receiving those, respectively. The invention will be explained in terms of TCP/IP networking suite, but a skilled person knowing the area can easily generalise the main ideas to suit any form of data networking.

The background of invention lies in two NRC projects, DRiVE and ASAB. In DRiVE we design and specify a so called hybrid radio network, which by definition consist of multiple, possibly administratively independent, standalone radio access systems. In DRiVE the main question is how to offer the end users multimedia services over heterogenous radio access systems transparently. Also, the goal is to make the service provision cost-efficient, both for end user and the network operators. The multimedia services here may consist of both multicast and unicast services. This invention, however, is applicable for multicast services.

In project ASAB we design and implement session (also called service) announcement facility for a broadcast system. The work contains two main parts. First, there is a service announcement server. Second, we design extensions to Session Description Protocol to make it capable of expressing more than just basic IP connectivity in fixed networks. Such extended announcements describe, for example, physical parameters of a DVB-T cell (frequency, MAC, and other link-level parameters). In addition, the announcements describe logical mappings that the user can use to find out how to reach the session he is interested. For example, given a multicast IP session, in which physical cells it is reachable. This mapping can also appear in reverse direction: given a physical cell, which multicast IP sessions are supported in that. This, the protocol specification work in ASAB is highly important for this invention.

### 2. A summary of the invention

The invention presents a way a (mobile) end user of a broadcast digital access system can perform cell-to-cell hand-over while preserving continuity of service. Here the service is assumed to be IP multicast session. It is easier to figure out the invention if one assumes that the multicast session is receive-only. However, the invention is equally applicable to multicast sessions that are not receive-only.

In the invention, there is a (mobile) end user that tunes to a digital broadcast data bearer. First user gets logical mapping messages that announce a presence of a multicast session. The user joins the session and starts receiving it. While receiving, the continuously received logical mapping messages keep him updated about contents of the neighbouring (horizontal or vertical) cells. When reception of the current bearer signal goes down, has errors, or fades out, the user uses the gathered logical mappings to select a new physical or logical cell to attach to. After this the user joins the session and starts receiving it.

### 3. Describe the problem which the invention overcomes

The problem is best explained with an example. When the user is moving he will pass a sequence of broadcast cell coverage areas. The user is receiving a session in one cell that he has tuned. When the user goes beyond the edge of the coverage area the reception will fade out if nothing is done. Surely, there are cases the user would like to preserve the session continuity.

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3

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## 4. How was the problem solved earlier?

One way is to manually search for a new bearer.

DVB-T standards might have some simple mechanism for performing some kind of DVB-T specific hand-over. (For an answer: please consult DVB-T specialist)

## 5. How does the invention improve earlier solutions? Advantages and disadvantages of the invention?

Enables end user to make more intelligent selections based on (possibly extensive) learned knowledge base.

## 6. Drawings and brief description of the drawings

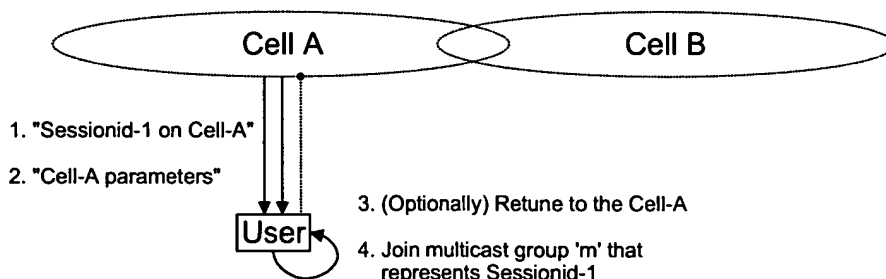


Figure 1

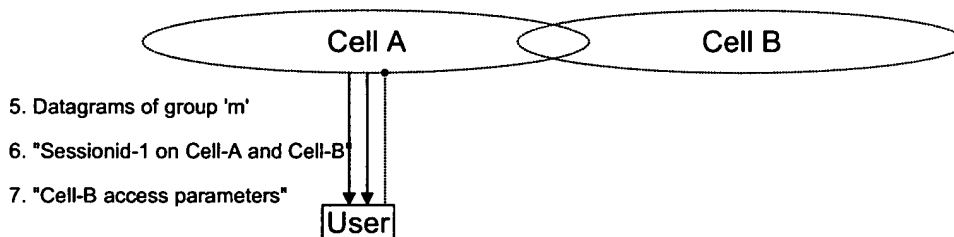


Figure 2

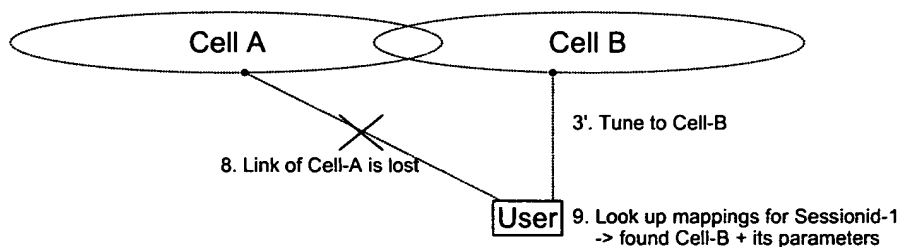


Figure 3

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4

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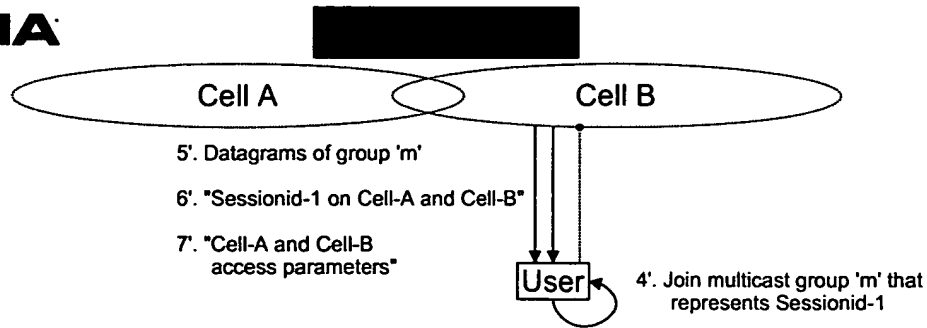


Figure 4

There are four figures (Figures 1 to 4) that present the sequence of events and actions that take place according to this invention. The following explanation details the sequence. Below, the 'user' is assumed to be intelligent service browser or equivalent – not the actual end user of the terminal equipment.

0. First, the user is attached to Cell-A and is receiving a logical announcement channel. This can be either predefined or dynamically configure IP multicast address. The broadcast network makes session announcements and mapping announcements available on this logical announcement channel.
1. User receives SDP announcement of session that has identifier Sessionid-1. There is also a mapping that tells that Sessionid-1 is available in Cell-A as well as in Cell-B.
2. User receives detailed link-level access parameters of Cell-A.
3. User optionally retunes to Cell-A (in case of DVB-T, user might need to change the MAC address or PID in the receiver end)
4. User joins the multicast group 'm' that was announced to represent Sessionid-1. Note that because user does not have an uplink, the join message is merely registered the operating system and the IP stack. However, it does not send any concrete IGMP join message anywhere.
5. User starts to receive datagrams of multicast group 'm' on Cell-A
6. While receiving group 'm', the user still receives session announcements and logical mappings. In this message, for example, Sessionid-1 is announced together with information that the Sessionid-1 is available on Cell-A as well as on Cell-B.
7. User receives detailed link-level access parameters of Cell-B
8. Reception of Cell-A signal may be lost for various reasons. The user may have left the coverage area, the Cell-A transmitter may experience a malfunction, there may be interference from some other source, etc.
9. User looks up the received mappings for Sessionid-1. He finds that Sessionid-1 is available on Cell-B. User also looks up for Cell-B and learns the detailed link-level access parameters.
- 3'. User tunes to Cell-B. (Note, from this point the logic follows numbering starting from 3.)

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5

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- 4'. User joins the multicast group 'm' that was announced to represent Sessionid-1.
- 5'. User starts (continues) to receive datagrams of multicast group 'm' on Cell-B
- 6'. While receiving group 'm', the user still receives session announcements and logical mappings. In this message, for example, Sessionid-1 is announced together with information that the Sessionid-1 is available on Cell-A as well as on Cell-B.

**7. A more detailed description of the invention (if known at the moment)**

See 6 above.

**8. Explain, how the invention is/can be implemented. Which would be the best mode of implementation?**

If the announcement capability already exists the implementation will have impact to end users, only. There are two ways to implement. First, as operating system level function, or the as intelligent service browser (preferred).

**9. Explain how we can recognise if a competitor is using the same product/feature?**

-

**10. Is it planned to use the invention in a Nokia product? If so, when and in which product? Is the invention standard related?**

NVO/NEW/IPDC and project ASAB are designing and implementing announcement server that is capable of performing the announcing system. That system might become a part of Nokia product by the end of year 2002.

**11. Abbreviations**

ASAB	Advanced Service Announcement for Broadcasting
DVB-T	Digital Video Broadcast Terrestrial
SDP	Session Description Protocol

**12. Any further comments**

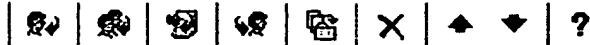
-

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6

Date:

Signature of Manager



**From:** Aarnio Ari (NVO/Helsinki)  
**To:** Patent-Agency Banner-Witcoff (EXT-RES/Washington)  
**Cc:**

**Subject:** 19377 Entitled A METHOD FOR PERFORMING HANDOVER FOR MULTICAST SESSIONS IN U

**Sent:** 10/1/01 6:02 PM

**Importance:** Normal

Banner & Witcoff Ltd

1001 G Street, N.W.  
Washington, DC 20001-4597  
USA

01.10.2001

Re: Intended U.S. Patent Application in the name of Nokia Corporation  
Entitled A METHOD FOR PERFORMING HANDOVER FOR MULTICAST SESSIONS IN U  
Your Ref:

Our Ref: 19377

Rating: 2S

Inventor: Toni Paila, Everstinkuja 1 c 66, 02600 ESPOO

Jani Poikela, Kaarikuja 4 F 125, 00940 HELSINKI

Lin Xu, Vilppulanpolku 4 A 1, 33720 Tampere

Juha-Pekka Luoma, Sammonkatu 8 C 36, 33540 TAMPERE

Rod Walsh, Mäentakusenkatu 17 A 3 33710 TAMPERE

Brad,

I hope you are able to draft this new application.

BR Ari [doc-ho.doc](#) [Noki handover US 6259683..htm](#) [19377 SEARCH A METHOD FOR PERFORMING HANDOVER FOR MULTICAST SESSIONS IN UNI-DIRECTIONAL ACCESS.htm](#)

*Reply by  
Tues w/sched/att4/etc.*



**From:** Patent-Agency Banner-Witcoff (EXT-RES/Washington)

**To:** Aarnio Ari (NVO/Helsinki)

**Cc:**

**Subject:** NC19377; B&W 4770.00026 - First Draft

**Sent:** 10/30/01 10:06 PM

**Importance:** Normal

Ari,

Attached please find a first draft application (13 pages, including claims and abstract) and figures (5 additional pages, figures 1-7) for the above-referenced matter. Please have the inventors review the draft and provide any comments or changes. Specifically, please have them at least answer the questions embedded in the application in [ALL CAPS IN BRACKETS]. As this Application has a file-by date of November 19, 2001, PLEASE PROVIDE ANY COMMENTS TO US BY NOVEMBER 12, 2001 so that we will have time to prepare the revised draft and return it to you for approval. As always, please do not hesitate to contact us with any questions. We look forward to receiving your comments soon.

Regards,

Ross Dannenberg

Banner & Witcoff, Ltd

1001 G Street, NW

Washington, DC 20001-4597

Direct: (202) 508-9153

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rdannenberg@bannerwitcoff.com

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422773\_1.DOC 427030\_1.PDF



**From:** Patent-Agency Banner-Witcoff (EXT-RES/Washington)

**To:** Aarnio Ari (NVO/Helsinki)

**Cc:**

**Subject:** NC19377; BW 04770.00026 - Revised Draft

**Sent:** 11/13/01 10:00 PM

**Importance:** Normal

Ari,

Attached please find a revised draft application and drawings for the above-referenced case, as well as formal declaration and assignment documents. Please have the inventors review the revised draft and, assuming all is in order, sign and return the executed declaration and assignment documents.

In reviewing the revised draft and accompanying papers, please note:

- 1) Also attached is a separate document showing the changes made in "redline" format, to more easily demonstrate the revisions from the previous draft.
- 2) Please confirm the inventors' citizenship information in the attached declaration document, as we only received citizenship information for the first named inventor. Please make any necessary corrections on the attached declaration document.
- 3) Please confirm the inventors' address information. Specifically, Rod Walsh has a different address than that provided with a previous application on which he is a named inventor. Please make any necessary corrections on the attached declaration and assignment documents.

Please let me know if you have any questions or if any other changes are required. As this application is due to be filed by November 19, please let us know as soon as possible if changes are required. Otherwise, we will file the application as soon as we receive the executed documents. Thank you for allowing us to be of assistance, and we look forward to hearing from you soon.

Regards,  
Ross

Ross Dannenberg  
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Washington, DC 20001-4597  
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Application - Redlined.DOC 427030 1.PDF 429489 1.DOC 429870 1.DOC 429871 1.DOC